

ROAD SAFETY AUDIT REVIEW

STATE ROUTE 115 (U.S. 129)

FROM NORTH CAROLINA STATE LINE (LOG MILE 0.00)


TO TABCAT BRIDGE (LOG MILE 11.19)

BLOUNT COUNTY

PIN # 109466.00

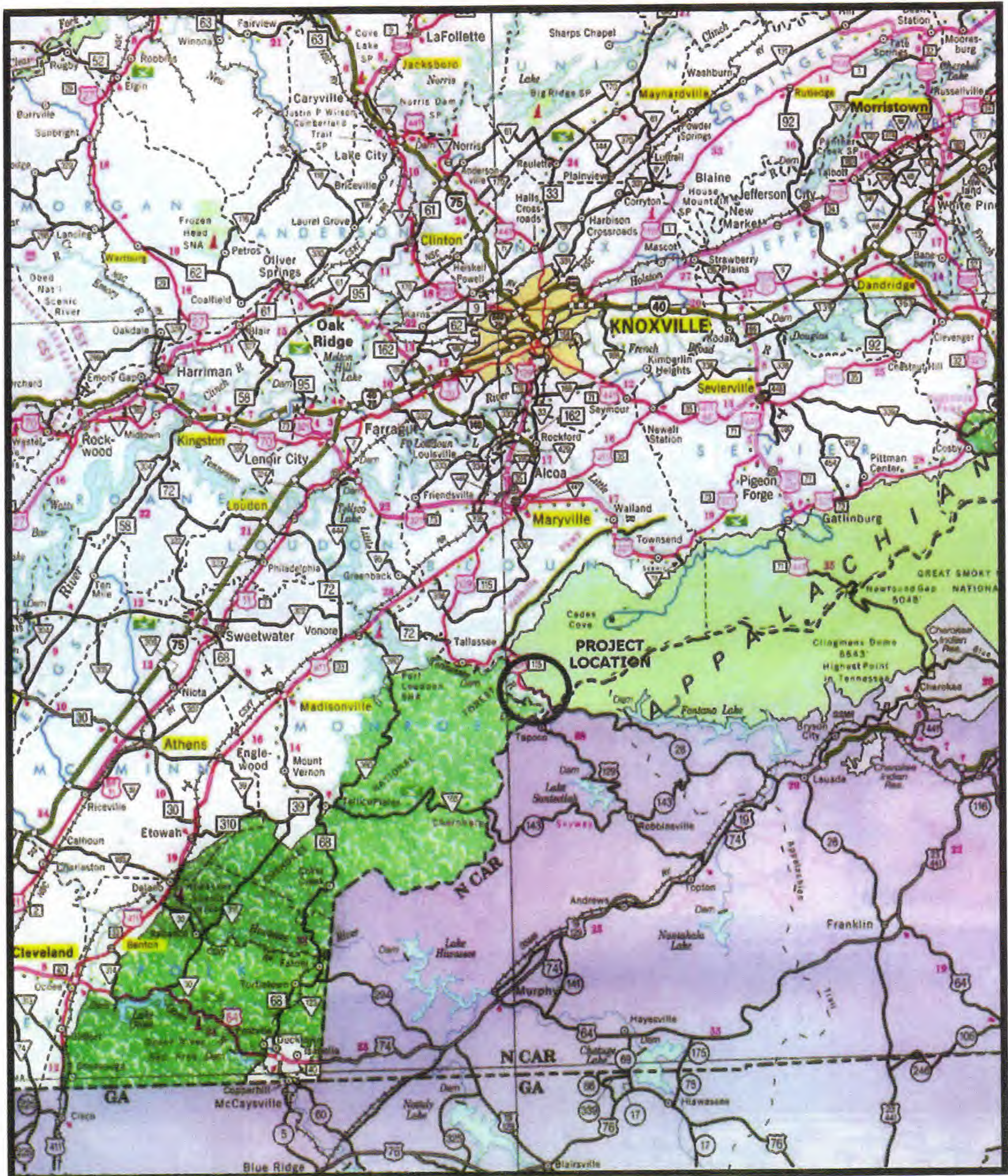


***PREPARED BY
TENNESSEE DEPARTMENT OF TRANSPORTATION
PROJECT PLANNING DIVISION***

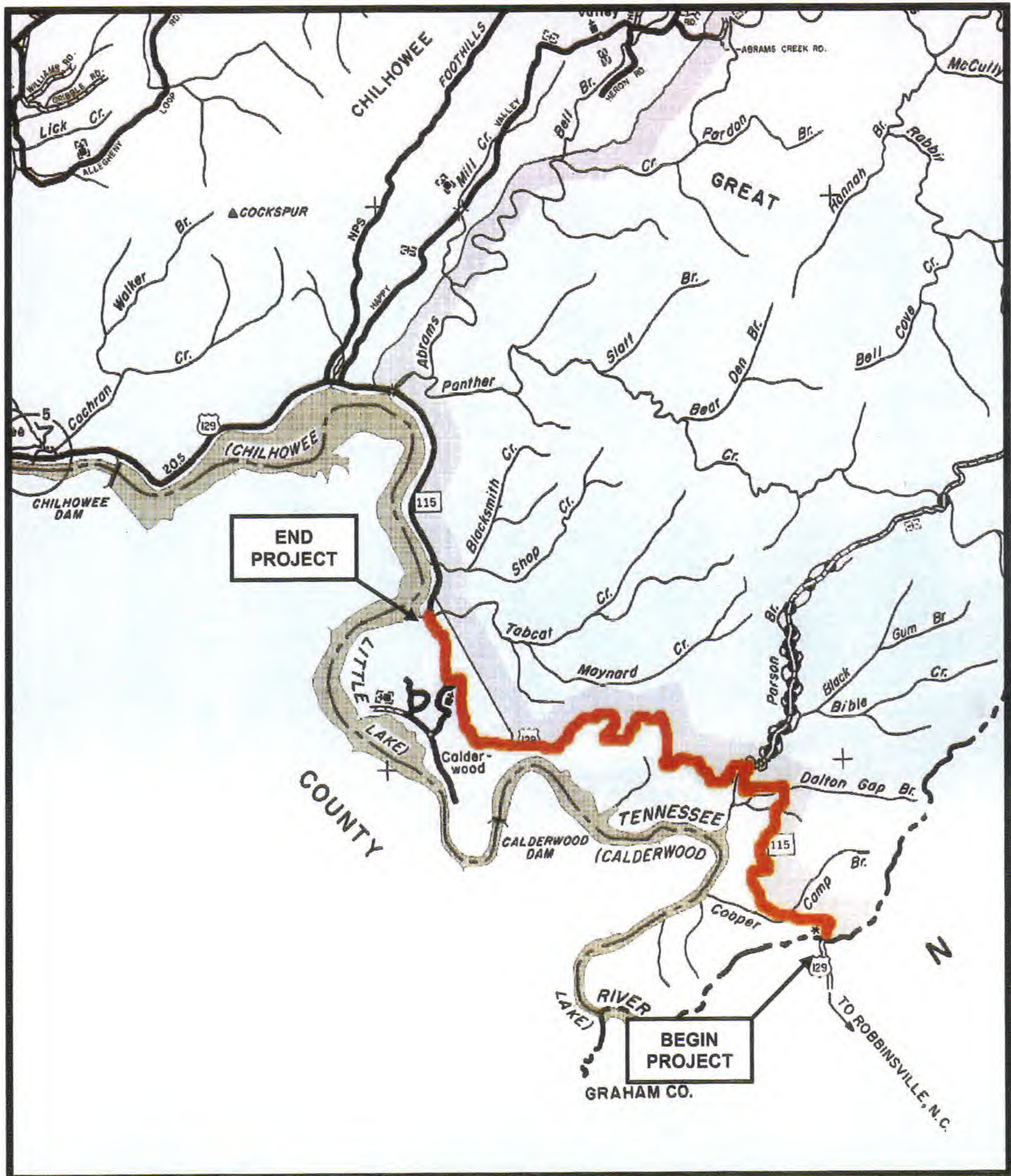
Approved by:	Signature	DATE
DIRECTOR PROJECT PLANNING DIVISION		7-25-07

This document is covered by 23 USC § 409 and its production pursuant to fulfilling public planning requirements does not waive the provisions of § 409.

VICINITY MAP



PROJECT LOCATION MAP



Road Safety Audit Review

Blount County

State Route 115 (U.S.129)

From Log Mile 0.00 to Log mile 11.19

Date of Review: May 17, 2007

Description of Project and Background

This project involves approximately 11 miles of State Route 115 known as the "Tail of the Dragon". This segment of roadway has become a popular tourist attraction for motorcyclists and sports car enthusiasts for its twisting turns and natural setting. The Project Planning Division was asked to evaluate this segment to determine what safety measures can be applied to reduce the high number of crashes which occur at various points along the roadway. The study segment is eligible for Hazard Elimination Safety Program funds.

Team Members

- Steve Allen - Director, TDOT Project Planning Division.
- Dudley Daniel - Transportation Manager 1, TDOT Conceptual & NEPA Planning Office.
- Amanda Snowden - Operations Specialist Supervisor 2, TDOT Region 1 Traffic Engineering Office.
- Nathan Vatter - Operations Specialist 3, TDOT Region 1 Traffic Engineering Office.
- Tony Armstrong - Transportation Manager 1, TDOT Project Planning Division.
- Michelle Powell - Operations Specialist, TDOT/Headquarters Traffic Engineering Office.
- Eric Jackson - Graduate Transportation Associate, TDOT Headquarters/Traffic Engineering Office.
- Paul Lane - Transportation Specialist 1, TDOT Project Planning Division.
- Ron Johnson - Webmaster of tailofthedragon.com and motorcycle enthusiast.
- Tim Wilson - Blount County Sheriff's Deputy.
- Houston Daugherty - Consultant, Smith Seckman Reid, Inc. (Observer).

Information used in the Review

- TRIMS Route Feature Description Listings
- TRIMS Highway Log Report
- TRIMS Photolog
- TRIMS Crash Summary Reports
- TRIMS Crash Rate Summary Reports
- TRIMS Traffic Reports
- Crash Reports
- Maps obtained from tailofthedragon.com
- Photographs and articles obtained from tailofthedragon.com
- Information obtained during previous visits by TDOT personnel
- Information provided by team members Ron Johnson, Tim Wilson, and Houston Daugherty
- Onsite Visit

Pre-Briefing Summary

After analyzing the information, this finding was made:

State Route 115 from Log Mile 0.00 to Log Mile 11.19 is eligible for **Hazard Elimination Safety Program** funds because the crash ratio (actual crash rate divided by critical crash rate) is 5.48, which is greater than 3.5 (the minimum threshold).

Observations

During the onsite visit, these observations were made:

- Large trucks regularly travel the route and cannot negotiate the curves without entering the oncoming lanes and riding on the soft shoulder. Lengthy travel delays are created as trucks frequently get stuck in the switchbacks.
- The warning sign advising trucks to consider an alternate route due to switchback curves is located at a point too near the project. Trucks are already committed to proceed unless they backtrack approximately 15 miles to U.S. 411 (State Route 33).
- Approximately 80% of the crashes in the three year analysis period of 2003 through 2005 involved motorcycles. Four of these crashes involved fatalities and eleven incapacitating injuries. Two of the fatalities were crashes into trees.
- Unsafe speeds contribute to many if not most of the crashes as motorcyclists are inclined to travel the route as fast as possible. The result is loss of control, laying the motorcycle down, and entering the oncoming lane. Passing slower vehicles in areas of insufficient sight distance also contributes to many crashes.
- The majority of the pull-offs along the route are gravel. This gravel is flung onto the road as vehicles exit the pull-offs, creating a safety hazard for motorcyclists. Fallen autumn leaves also contribute to slick conditions.
- Most of the pull-offs are on the southwest side. The insufficient number on the northeast side results in vehicles crossing the roadway in areas of limited sight distance to park on the southwest side of the route.
- Standard guardrails designed for automobiles are in place at four locations along the project. Three of these are on the southwest side at log miles 7.1, 8.6 and 9.5. The fourth is on the northeast side at log mile 8.7. Their placement and construction, as well as height, profile, composition, and proximity to the roadway can be hazardous to motorcyclists.
- Fallen trees and limbs along the roadside present a safety hazard for motorcyclists who lose control and exit the roadway.
- The white striping which designates the edge of roadway is fading at some locations. In addition, the existing striping becomes slick when wet creating a hazard for motorcyclists.
- At some locations, the roadside ditches have eroded to a dangerous depth.
- There is insufficient sight distance in some locations due to mountainside cuts too close to the roadway.
- Existing signage before curves is minimal. Also, the overlook has no signage designating its location on the approaches to the area.
- The traffic lanes are nine feet in width.
- The posted speed limit on the route is 30 mph.

Guidance

Due to the length of the study section, this RSAR has concentrated on nine separate locations that recorded a fatality, had an unusually high number of crashes, or were designated as problem spots by regular users of the route. Proposed guidance to improve the safety situation at these locations is provided below along with the location's approximate log mile and local name. These locations are identified on the Project Topographic Map.

1. Log Mile 0.29 (Crud Corner) – This location is the site of a fatality. At 0.29 miles from the North Carolina State Line, this hairpin curve has a graveled shoulder on the inside of the curve. Pave this gravel area and re-stripe the pavement. Add "Hairpin Curve" signs (W1-11) on both approaches to the curve.



CRUD CORNER



W1-11
Hairpin Curve

2. Log Mile 1.55 (The Wall) – This location is the site of a fatality. Install a "Reverse Curve" sign (W1-4) on the northbound approach to this spot.



THE WALL



W1-4
Reverse Curve

3. Log Mile 2.91 (The Hump) – This area recorded the highest number of crashes or any location on the project. Install “Curve” sign (W1-2) on southbound approach. Also install “Dip” signs (W8-2) on both approaches. Add pavement on inside shoulder of roadway at the dip.



THE HUMP



W1-2
Curve



W8-2

4. Log Mile 4.42 (Busa Bash) – This location is at a curve at the end of a relatively long downhill segment southbound where speeds increase. Create an earthen berm along the tree line on the southwest side of the route. Clear downed limbs from shoulder. Install “Winding Road” sign (W1-5) at the top of the hill on the southbound approach to this spot.



BUSA BASH (AT BOTTOM OF HILL)



BUSA BASH



W1-5
Winding Road

5. Log Mile 7.20 (Guardrail Cliff) – Loss of control on the curve in advance of the guardrail results in crashes both before and into the barrier. Build an earthen berm along the outside of the curve from the existing berm to the guardrail terminus.



GUARDRAIL CLIFF

6. Log mile 8.25 (East of Cat Tail Straight) – This is the site of a fatality. Fill in the eroded ditch on the north side of the roadway to a level to be determined by the maintenance engineer.



LOG MILE 8.25 (EAST OF CAT TAIL STRAIGHT)

7. Log Mile 8.64 (The Overlook) – Cut back embankment on north side across from the overlook to improve sight distance. Install diamond shaped warning signs which caution motorists of congested area ahead on both approaches to the overlook. Install “Scenic Overlook” signs on both approaches approximately one mile in advance of the overlook and second overlook signs with arrows approximately 250' in advance.



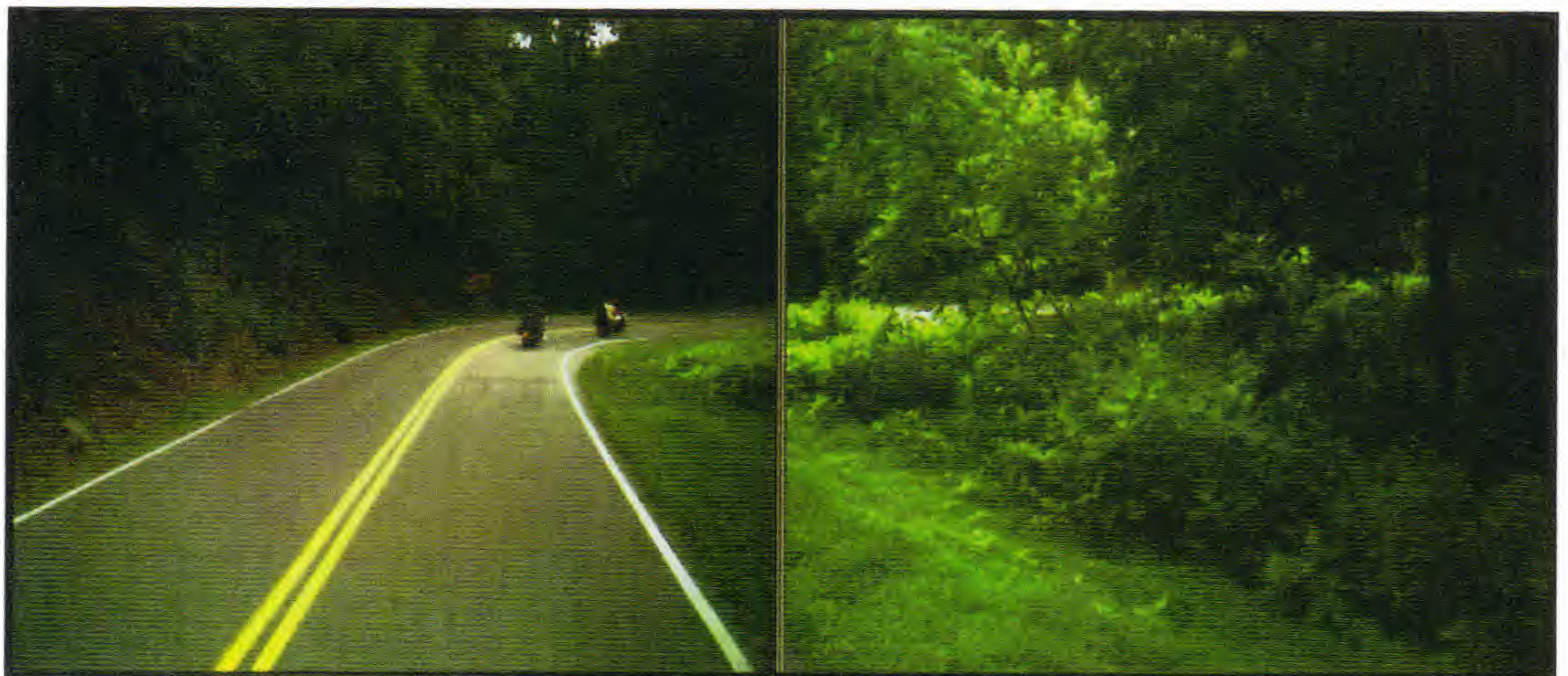
THE OVERLOOK



OVERLOOK EMBANKMENT



8. Log Mile 9.95 (The Whip) – This is the location of a hairpin curve. Both approaches to the curve are relatively straight and downhill. This allows motorcyclists to increase their speed before the curve resulting in loss of control in the curve. Install “Hairpin Curve” signs (W1-11) on both approaches to the curve.



THE WHIP SOUTHBOUND



THE WHIP NORTHBOUND



**W1-11
Hairpin Curve**

9. Log Mile 10.18 (Rocket Corner) - This location is the site of a fatality. It is in a curve where an access road to the Calderwood Hydroelectric Development intersects. Delineate the wide shoulder on the side of the road access with dashed white lines. These lines should be 4" in width to match the existing striping width and should be placed so that there is a 2' dash with a 4' gap. Also connect the break in the double yellow lines with 4" wide yellow skip lines. Install "Arrow" signs (W1-6L & W1-6R) in the curve facing both directions.



ROCKET CORNER NORTHBOUND



ROCKET CORNER SOUTHBOUND



W1-6L



W1-6R

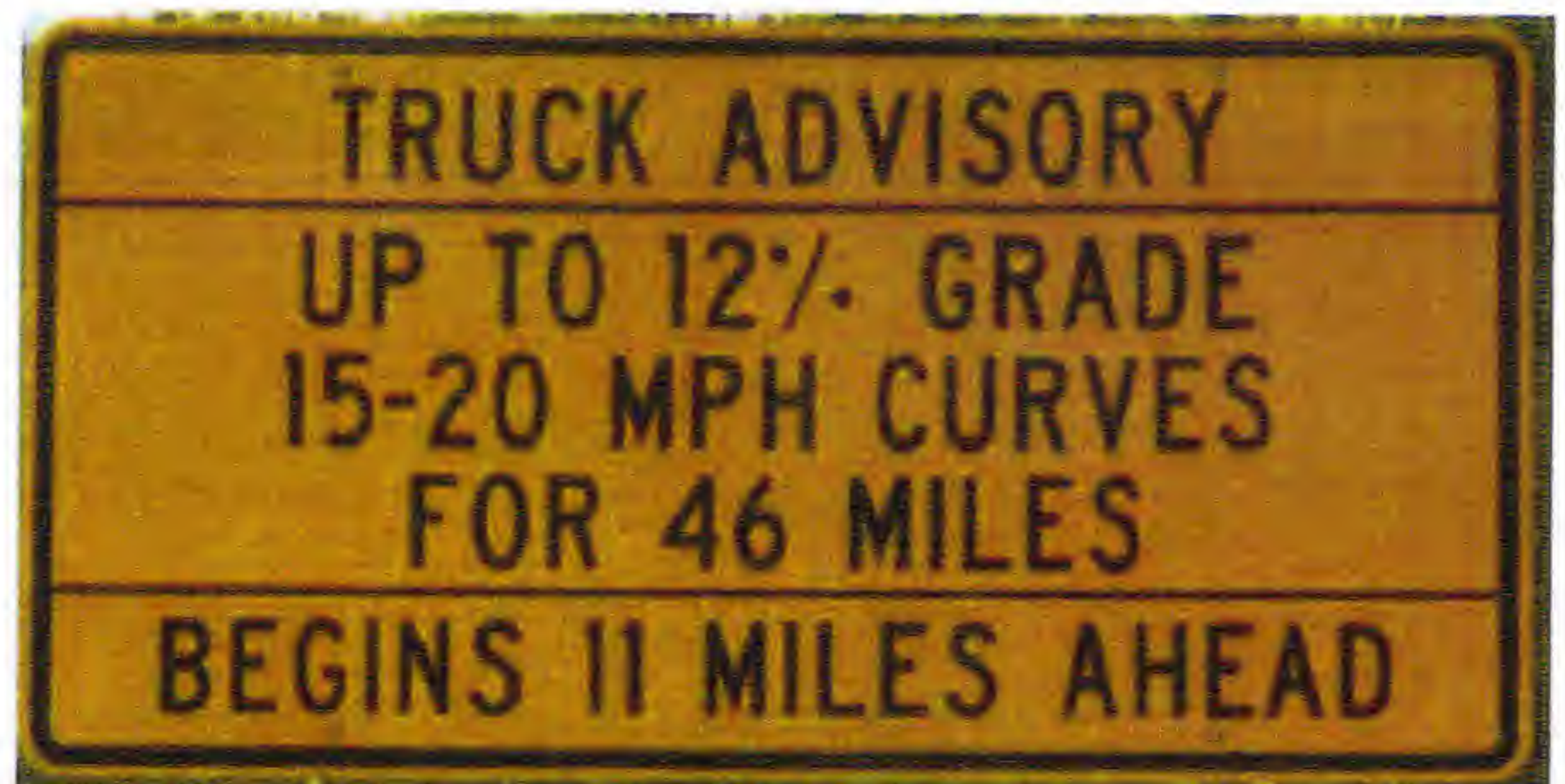
Large Arrow (one direction)

In addition to the proposed safety improvements recommended at these nine specific locations, supplemental guidance includes the following:

- Place signs along State Route 33 (U.S. 411) advising truckers of the hazardous switchbacks and mountainous terrain on State Route 115 (U.S. 129). Possible locations for these signs are at the State Route 33 intersections with State Route 115, State Route 336, and State Route 72. These signs should include a warning to vehicles with travel trailers in tow.



**EXISTING SIGN NEAR
FOOTHILLS PKWY.**



**SIGN AT N.C. STATE ROUTE 28 & U.S. 74
WELL IN ADVANCE OF THIS PROJECT**



EXAMPLE OF A SIGN WHICH MAY BE UTILIZED

- Widen, extend, and pave the existing gravel pull-offs on the northeast side of the roadway to reduce the number of northbound vehicles crossing the route to access southbound pull-offs. There are 33 small pull-offs in existence on this side of the roadway, each of which will accommodate only one or two automobiles. Their approximate log mile and vehicle capacity are as follows: 0.35 (1); 1.13 (1); 1.35 (2); 1.76 (1); 2.00 (1); 2.45 (1); 2.68 (1); 2.91 (2); 3.06 (1); 3.23 (2); 4.12 (1); 4.44 (1); 4.49 (1); 5.48 (1); 5.20 (1); 5.72 (1); 6.09 (1); 6.42 (2); 6.49 (1); 6.56 (1); 6.76 (1); 7.04 (1); 7.12 (1); 7.19 (2); 7.28 (2); 8.05 (1); 8.70 (2); 8.99 (2); 9.25 (2); 9.33 (2); 9.40 (2); 9.48 (2); 10.36 (1).
- Pave the large parking area near Tabcat Bridge (log mile 11.08). Utilize pavement markings to channelize traffic entering and exiting the parking area with a 3' wide island.



TABCAT BRIDGE PARKING AREA

- Pave all the existing gravel pull-offs on the southwest side to reduce the amount of gravel along the route and to minimize the loss of control when entering a pull-off. There are a total of 60 pull-offs of various sizes in existence on this side of the roadway. Their approximate log mile and vehicle capacity are as follows: 0.08 (3); 0.31 (2); 0.45 (2); 0.51 (3); 0.76 (4); 0.89 (5); 1.05 (3); 1.26 (3); 1.31 (4); 1.46 (3); 1.57 (4); 1.85 (8); 2.01 (2); 2.04 (2); 2.21 (3); 2.38 (2); 2.42 (2); 2.54 (1); 2.60 (2); 2.73 (1); 2.94 (3); 3.05 (6); 3.35 (3); 3.45 (3); 3.90 (3); 4.07 (4); 4.11 (2); 4.43 (1); 4.47 (2); 4.58 (3); 4.64 (3); 4.78 (2); 4.82 (2); 5.10 (2); 5.27 (2); 5.32 (3); 5.39 (3); 5.64 (1); 5.75 (3); 5.93 (4); 6.14 (2); 6.20 (3); 6.33 (2); 6.51 (4); 6.60 (3); 6.71 (1); 6.74 (1); 6.84 (1); 7.02 (8); 7.07 (1); 7.17 (2); 7.23 (3); 7.44 (3); 7.95 (2); 8.05 (1); 8.27 (2); 8.32 (3); 9.12 (1); 9.48 (2); 9.74 (4).
- A proclamation was issued by the Tennessee State Senate, dated June 20, 2003, naming this eleven mile stretch of State Route 115 "The Dragon". Therefore, signs may be erected stating "ENTERING THE TAIL OF THE DRAGON" at each end of the route. Warning plaques should accompany these signs regarding the dangerous switchbacks, utilizing safe speeds, and staying in lane.

- The Tennessee Highway Patrol (THP) has decided to take action in eliminating commercial activity along state right-of-way in the project area. This enforcement is intended to disallow persons from taking photographs of vehicles and motorcyclists with the intent of selling the photographs at a later date. The THP contends this activity is a hazard to public safety. It is recommended that signs be placed at the entrance of each end of the route advising of this policy.
- The Governor's Highway Safety Office has awarded grants of \$60,000 each to the Tennessee Highway Patrol and the Blount County Sheriff's Office to step up enforcement of traffic laws along the project. This grant money is set to extend from July 1, 2007 to September 30, 2007. Continuation of this program is recommended during peak travel seasons.
- Examples of additional signage which may be used at various locations along the route are depicted below. These are to be placed at the discretion of traffic engineers.



WB-7



WB-9



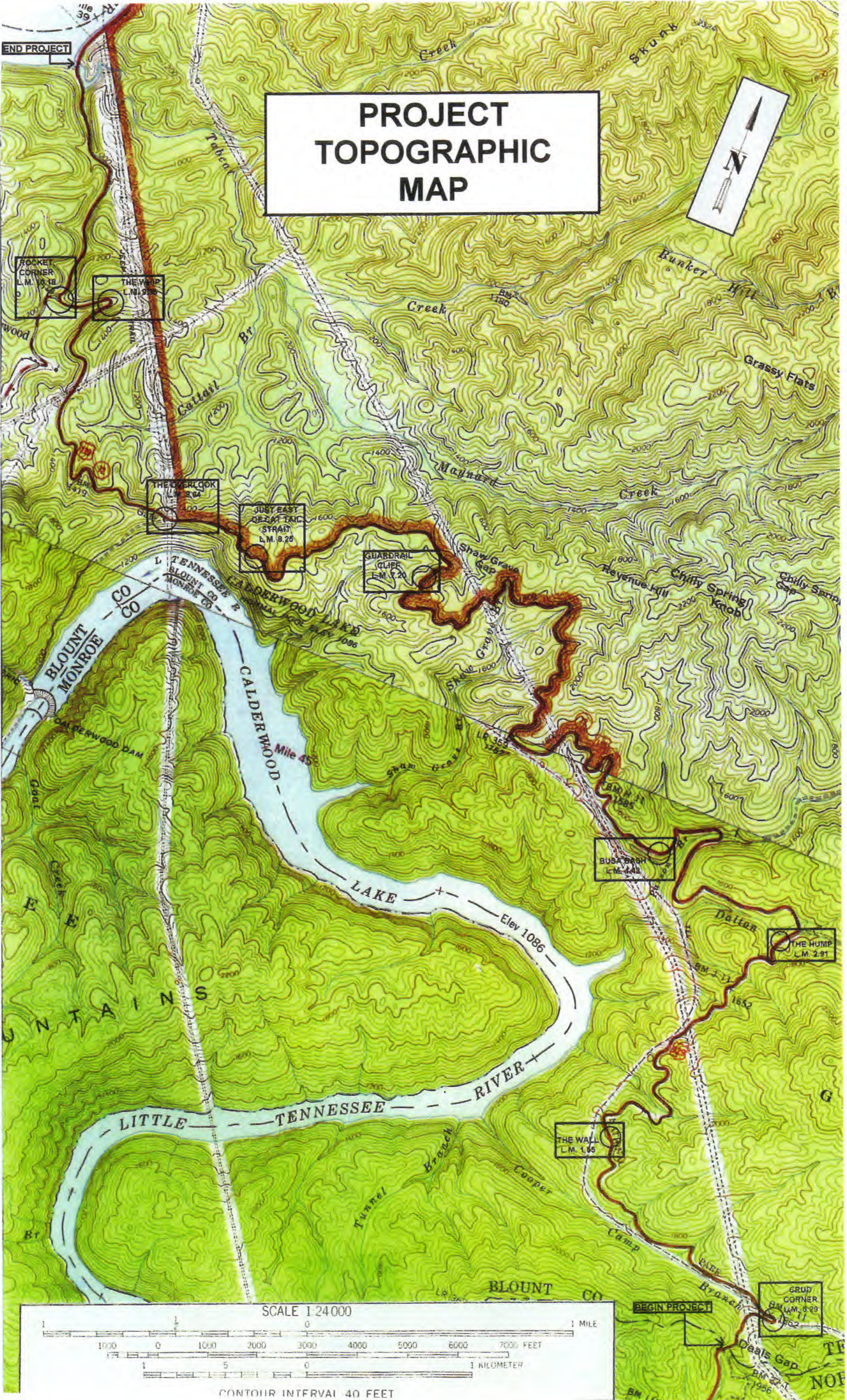
WB-8a



Route:	State Route 115 (U.S. 129)
Description:	From L.M. 0.00 to L.M. 11.19
County:	Blount
Date:	7/23/2007

Pavement markings	\$	115,000
Pavement	\$	300,000
Earthwork	\$	30,000
Signing	\$	9,925
Ditch Repairs	\$	2,000
Removal of Debris (Downed Limbs)	\$	5,000
Maintenance of traffic	\$	225,000
MOBILIZATION	\$	35,000
CONSTRUCTION COST	\$	721,900
10% ENG. & CONT.	\$	72,000
TOTAL CONSTRUCTION COST	\$	793,900
10% PRELIMINARY ENGINEERING	\$	72,000
4%x 1 year= 4%	\$	35,000
TOTAL COST	\$	900,900

PROJECT TOPOGRAPHIC MAP



SCALE 1:24,000



CONTOUR INTERVAL 40 FEET



STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
NASHVILLE, TENNESSEE 37243

July 8, 2002

Mr. Mark Best
Operations Spec. Superv. 2
P.O. Box 58
7345 Region Lane
Knoxville, TN 37901

Dear Mr. Best:

RE: Speed Reduction Request
SR 115 (U.S. 129) from L.M. 0.00 to L.M. 11.19
Blount County

An engineering investigation conducted by the Department of Transportation, indicates the speed limit on SR 115 (U.S. 129) in Blount County should be less than the maximum speed provided in Section 55-8-152 of the Tennessee Code Annotated.

Therefore, as State Traffic Engineer for the Department of Transportation, I do hereby declare the establishment of the following speed zone along SR 115:

30 MPH from L.M. 0.00 to L.M. 11.19

Please have your Signing and Marking Superintendent make the necessary signing installations.

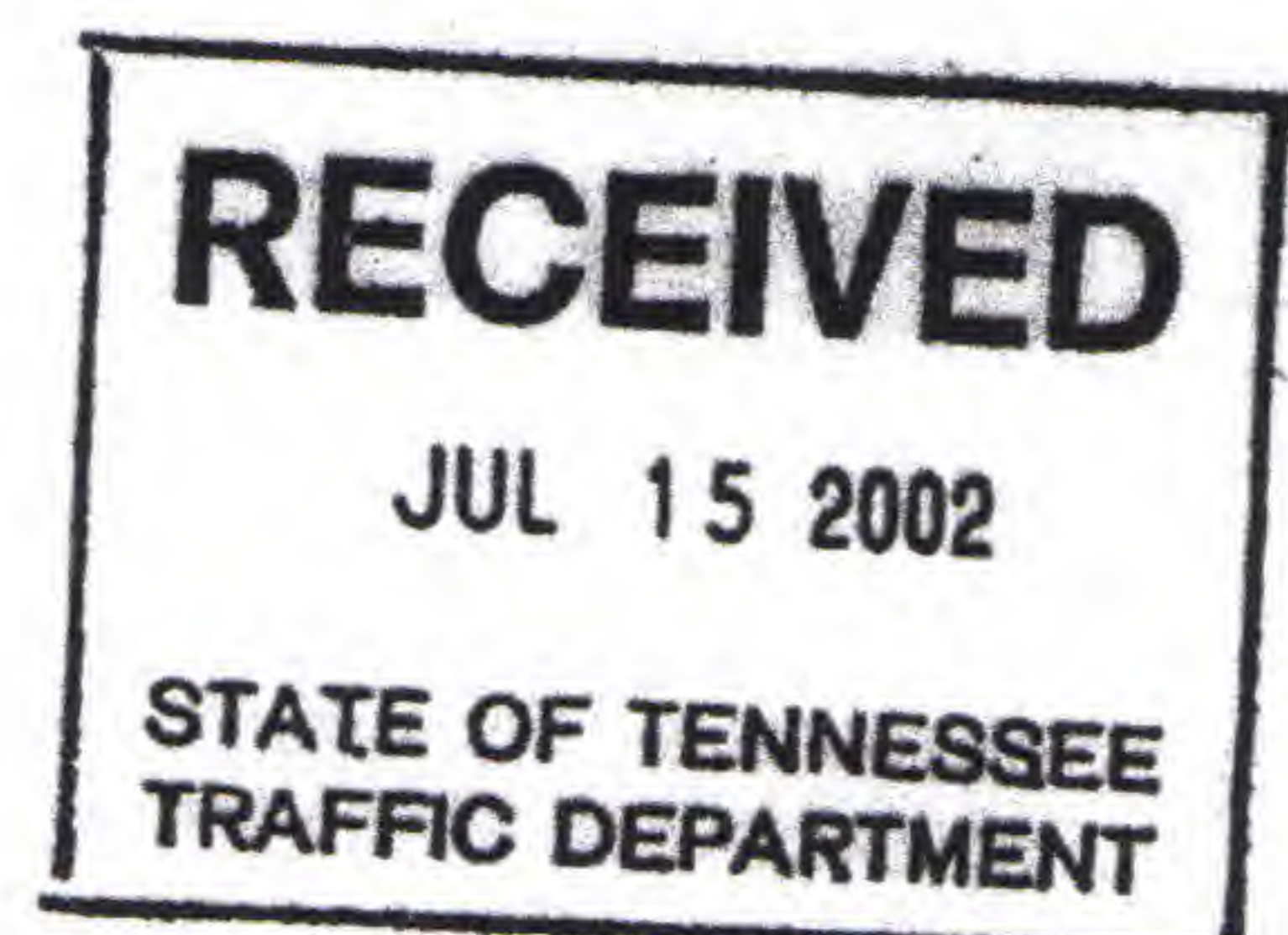
The foregoing action has been taken pursuant to the authority granted the Department of Transportation under the provisions of Section 55-8-153 of the Tennessee Code Annotated, and is effective this date.

Sincerely,

Michael L. Tugwell, P.E.
Traffic Engineering Office
Maintenance Division

MLT/bja

cc: William A. Crisp, County Executive
Denny King, Commissioner
H. Gerald Gregory
Fred Corum
File #T05115193





STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
P. O. BOX 58
KNOXVILLE, TENNESSEE 37901

February 23, 2011

Mr. John Lee

RE: Request for Information

Dear Mr. Lee:

Please find enclosed the Road Safety Audit Review of U. S. 129 from North Carolina State Line to Tabcat Bridge in Blount County, dated July 25, 2007. We have no record of a Traffic Engineering Survey and/or Speed Audit for this location.

Mr. Nathan Vatter is our current Traffic Engineer; however, you should direct further request for information to this Legal Office for processing. If I can be of further assistance to you, please call me at 865-594-2493,

Sincerely,

A handwritten signature in dark ink, appearing to read "Marion E. Hilt", is written over the typed name.

Marion E. Hilt

Staff Attorney

Sign & Marking Request

To: Tommy Campbell
Region One Sign & Marking Office
From: Mark Best
Regional Traffic Engineer
Date: 07/15/02

RECEIVED

AUG 15 2002

STATE OF TENNESSEE
TRAFFIC DEPARTMENT

State Route:	115
County:	Blount
City:	
Log Mile:	0.00 – 11.19
Intersection near:	
Other location info:	NC State line to Tabcat Creek
Type of Request: <ul style="list-style-type: none">• Install and/or change speed limit signs designating route as 30 mph.• See attachment.	

Completed By: S. Crabtree & H. Kidwell

Completion Date: 8-13-2002

Comments: _____

WORK ORDER # 45-2002

**Motorcycle-Indicated THP-Issued Citations
1999-2008**

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Anderson	6	3	8	12	5	5	31	13	39	70	192
Bedford	4	2	5	0	4	3	28	13	1	9	69
Benton	16	33	95	51	27	0	12	5	23	19	281
Bledsoe	8	5	7	4	3	0	6	0	3	10	46
Blount	20	4	7	14	6	25	97	75	314	459	1,021
Bradley	9	6	12	5	5	10	15	16	30	16	124
Campbell	15	11	17	20	9	22	49	2	42	23	210
Cannon	2	6	4	2	3	1	2	0	0	5	25
Carroll	6	11	15	28	25	10	20	12	67	8	202
Carter	4	3	20	10	18	31	31	21	69	36	243
Cheatham	0	3	4	1	4	9	10	2	18	5	56
Chester	0	0	1	2	2	1	10	20	26	13	75
Claiborne	0	0	4	0	0	0	23	10	15	8	60
Clay	0	0	1	0	0	0	10	13	11	13	48
Cocke	8	5	7	6	1	10	10	9	12	16	84
Coffee	15	10	42	34	49	14	18	7	10	18	217
Crockett	1	6	9	90	63	7	6	4	9	9	204
Cumberland	8	8	0	2	3	3	39	23	62	77	225
Davidson	36	117	151	132	181	19	17	37	18	38	746
Decatur	2	11	6	4	13	2	8	1	17	17	81
De Kalb	0	1	7	6	6	5	15	19	24	20	103
Dickson	5	8	5	0	0	3	0	0	5	0	26
Dyer	28	4	4	17	5	4	29	21	23	18	153
Fayette	2	8	3	9	9	7	24	6	19	6	93
Fentress	0	3	0	3	0	1	4	13	10	26	60
Franklin	11	9	3	0	0	10	21	5	9	16	84
Gibson	7	2	9	19	10	19	23	28	28	37	182
Giles	8	7	17	5	4	4	9	22	6	18	100
Grainger	7	6	9	0	5	2	5	2	14	7	57
Greene	25	16	3	12	6	6	12	7	15	35	137
Grundy	9	13	10	15	25	11	26	7	21	27	164
Hamblen	2	2	20	7	1	27	13	13	7	17	109
Hamilton	10	11	11	29	12	20	94	60	58	29	334
Hancock	0	0	0	0	0	0	3	9	4	7	23
Hardeman	3	2	4	1	9	14	21	19	20	6	99
Hardin	9	4	11	5	1	12	30	20	24	17	133
Hawkins	4	1	2	7	9	5	19	5	28	12	92
Haywood	47	43	19	35	62	33	25	8	35	4	311
Henderson	18	35	6	2	10	1	28	21	58	69	248
Henry	3	31	32	20	16	7	40	8	51	30	238
Hickman	8	5	11	8	8	2	18	17	17	7	101
Houston	0	2	3	1	2	8	0	0	3	4	23
Humphreys	2	3	8	0	0	1	0	0	1	1	16
Jackson	0	1	11	5	3	0	16	12	24	34	106
Jefferson	0	6	5	4	5	12	10	6	19	11	78
Johnson	0	0	4	12	7	40	45	30	195	106	439
Knox	315	253	170	48	34	17	119	55	126	230	1,367
Lake	5	9	4	1	0	1	2	6	15	4	47
Lauderdale	7	11	7	4	25	4	8	21	12	2	101
Lawrence	3	1	3	4	2	3	25	22	16	11	90
Lewis	0	0	0	0	0	0	0	5	15	8	28
Lincoln	1	20	5	13	1	14	18	28	45	32	177
Loudon	10	7	9	8	14	5	16	19	21	28	137
McMinn	4	5	4	0	4	2	16	11	15	24	85
McNairy	3	8	2	8	8	6	7	23	33	32	130
Macon	2	3	2	0	6	8	15	21	9	11	77
Madison	8	12	22	9	19	12	30	46	27	33	218
Marion	17	21	20	10	15	24	38	21	48	32	246
Marshall	0	4	3	0	2	23	18	26	37	30	143
Maury	5	7	1	11	19	14	28	41	44	43	213
Meigs	1	0	0	5	0	0	7	6	10	9	38
Monroe	4	5	101	24	23	29	35	22	64	34	341
Montgomery	12	15	30	15	3	14	26	49	58	38	260
Moore	1	1	0	0	5	0	7	11	6	13	44
Morgan	1	1	0	0	2	0	10	11	22	69	116
Obion	34	18	25	19	32	51	56	22	38	12	307
Overton	4	3	6	0	0	4	8	7	23	19	74
Perry	8	0	1	7	1	0	10	7	8	14	56
Pickett	0	1	1	0	0	1	15	10	6	6	40

Motorcycle-Indicated THP-Issued Citations 1999-2008

County	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Polk	4	0	1	5	2	6	5	13	25	15	76
Putnam	5	10	16	15	11	9	30	26	29	66	217
Rhea	1	3	0	5	0	2	25	5	11	17	69
Roane	10	1	1	6	2	6	34	8	35	50	153
Robertson	15	36	45	18	31	34	81	19	52	36	367
Rutherford	3	44	45	3	11	36	124	78	74	110	528
Scott	1	1	23	0	5	20	18	3	8	8	87
Sequatchie	0	2	0	1	0	3	13	1	2	5	27
Sevier	0	1	3	5	1	7	33	8	36	56	150
Shelby	14	3	38	18	42	39	28	16	86	10	294
Smith	2	8	3	10	3	4	14	13	22	12	91
Stewart	2	5	4	5	10	1	7	15	5	28	82
Sullivan	129	486	51	25	1	10	36	34	43	32	847
Sumner	16	17	19	9	29	11	95	60	62	70	388
Tipton	9	2	7	10	6	10	35	28	13	21	141
Trousdale	0	8	6	4	0	7	9	4	11	28	77
Unicoi	0	0	10	6	6	12	35	13	45	19	146
Union	1	0	4	3	1	2	1	4	5	11	32
Van Buren	6	0	0	0	0	0	8	1	4	6	25
Warren	5	0	2	0	2	10	16	8	9	8	60
Washington	48	64	117	106	2	10	65	32	146	13	603
Wayne	2	0	3	9	1	1	10	13	27	24	90
Weakley	8	10	4	30	5	5	50	18	31	27	188
White	5	1	4	0	0	1	10	9	8	14	52
Williamson	0	2	9	7	1	10	26	25	41	68	189
Wilson	14	20	26	21	29	38	87	46	73	101	455
Unknown	0	0	0	0	0	0	0	0	0	0	0
Total	1,113	1,596	1,489	1,146	1,052	952	2,381	1,631	3,105	3,022	17,487

Source: TN Dept. of Safety, Office of Research, Statistics, and Analysis, 06/18/2009.

Note: 2007-2008 data is preliminary. There may still be citations outstanding that have not yet been keyed to the database, and thus are not included in the totals.